

# NASA TECH BRIEF



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## Ultrasonic Cleaning Restores Depth-Type Filters

### The problem:

To devise a cleaning process for depth-type fibrous filters that will restore them to maximum effectiveness.

### The solution:

Use a nonionic surfactant and ultrasonic agitation.

### How it's done:

The filter to be cleaned is coated with a nonionic surfactant and is then placed in an ultrasonic cleaning bath containing only water. The bath is equipped with a small centrifugal pump and a membrane filter holder in a simple recirculating system. The filter is then agitated ultrasonically in the bath for one hour, with the pump operating for 20 seconds of every minute. After cleaning, the filters are rinsed and dried and are then ready for reuse.

### Notes:

1. Filters cleaned by this process were restored essentially to the same effectiveness as in their original condition. In general, the filters showed an increase in collection efficiency and a decrease in capacity with multiple cleanings, as more of the fine-particle contaminants were retained within the fibrous structure. While it may never be possible to equal a surface collector in cleanability, test results indicate that ultrasonic cleaning should enable

depth-type fibrous filters to be reused a number of times. In addition, the greatly increased solids capacity inherent in a depth-type filter obviates the need for perfect cleaning prior to reuse of the filter.

2. In the tests conducted on the cleaning of the filters by ultrasonic methods, a run was terminated after pressure differentials reached 20 psi, whereas in the field such differentials may exceed 100 psi. In the latter case it is likely that the collected contaminants might be held more tightly within the filter structure, making removal more difficult and thus requiring some modifications of this procedure.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama 35812  
Reference: B66-10298

### Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Arthur D. Little, Inc.  
under contract to  
Marshall Space Flight Center  
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Category 03